


# *Bay Tree Lake State Park*

## *General Management Plan*





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**BAY TREE LAKE STATE PARK**  
**GENERAL MANAGEMENT PLAN**

**Department of Environment, Health, and Natural Resources**

**Division of Parks and Recreation**

**Planning and Development Section**

**February, 1996**



# INTRODUCTION

Planning is an essential element of effective and efficient park administration and management. The North Carolina General Assembly acknowledged its importance by passing state parks system legislation that includes planning requirements.

The 1987 State Parks Act (G.S.114-44.7 through 114-44.14) stipulates that a State Parks System Plan be prepared. The plan was completed in 1988 and revised in 1994. It evaluated the statewide significance of each park, identified duplications and deficiencies in the system, described the resources of the system, proposed solutions to problems, described anticipated trends, and recommended means and methods to accommodate trends.

The State Parks Act also requires each park to have an individual general management plan. The general management plans are required to:

*...include a statement of purpose for the park based upon its relationship to the System Plan and its classification. An analysis of the major resources and facilities on hand to achieve those purposes shall be completed along with a statement of management direction. The general management plan shall be revised as necessary to comply with the System Plan and to achieve the purpose of the [State Parks Act].*

The general management plan (GMP) is to be a comprehensive five-year plan of management for a park unit. GMP's function to:

1. describe park resources and facilities;
2. state the purpose and importance of each park unit;
3. outline interpretive themes and propose locations for informational and interpretive facilities;
4. analyze park and recreation demands and trends in the park's service area;
5. summarize the primary laws guiding park operations;
6. identify internal and external threats to park natural and cultural resources, and propose appropriate responses;
7. identify and set priorities for capital improvement needs;
8. analyze visitor services and propose efficient, effective, and appropriate means of responding to visitor needs; and
9. review park operations and identify actions to support efficient and effective park administrative procedures.

This GMP for Bay Tree Lake State Park, developed with public involvement, is intended to serve these purposes.



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# **I. DESCRIPTION OF BAY TREE LAKE STATE PARK**

## **LOCATION AND ACCESS**

Bay Tree Lake State Park is situated in the eastern coastal plain of North Carolina in Bladen County, approximately halfway between Wilmington and Fayetteville.

U.S. 701 is the principal access to the region. Bay Tree Lake State Park is located on N.C. Highway 41, approximately 11 miles east of Elizabethtown (Figure I-1).

## **LAND BASE**

Bay Tree Lake State Park consists of 2,027 acres: 609 acres of land and the 1,418-acre Bay Tree Lake, a Carolina Bay. The park land is located on the western side of the lake between the lake and NC 41.

Bay Tree Lake is named for the sweet bay, loblolly bay, and red bay found growing around it. The oval-shaped lake is one of the few Carolina Bays with open water. In addition to the typical bay vegetation around the lake, the park also contains higher sand ridges that provide habitat for turkey oak, long-leaf pine, blueberry, and holly.

The shallow, natural lake receives no significant overland inflows but receives its inputs of water primarily from precipitation.

## **VISITOR FACILITIES**

Bay Tree Lake State Park is not currently staffed or developed with visitor facilities. An unpaved road approximately 1.65 miles long provides access from NC 41 to the lake, and this road is gated off to the public.

The park master plan calls for facility development at Bay Tree Lake, and this GMP evaluation confirmed the desirability of providing visitor facilities. Future facility development being recommended is described in Chapter VII of this plan.

Figure I-1.



## HISTORY OF THE PARK AREA

The first white settlement of the region occurred when Highland Scots claimed land along the Cape Fear River in 1740. Farming, principally concentrated along river plantations, became important economically. Farming became less important economically as turpentine and tar production and timber harvesting became the region's chief sources of income. By 1860, as the region's merchantable forest resources became increasingly depleted, agriculture underwent a rejuvenation and cotton farming became popular.

Statewide interest in the Carolina bay lakes emerged in the 1820s. During the 1827-1828 legislature, a bill was enacted that made it unlawful for anyone to record for private ownership the lands covered by the waters of any lake within North Carolina. This law followed the limitation of the private recording of unappropriated marsh or swamplands that was enacted during the previous legislature.

The General Assembly of 1922 passed legislation that provided that

*White Lake, Black Lake [now Bay Tree Lake], Waccamaw Lake, and any other lake in Bladen, Columbus, or Cumberland counties containing 500 acres or more shall never be sold nor conveyed to any person, firm or corporation, but shall always be and remain the property of the State of North Carolina for the use and benefit of all the people of the State. (Chapter 8, G.S. 7544)*

This legislation confirmed the status of the 1,418-acre Bay Tree Lake as a state-owned, public trust resource. In 1929, the law was amended to include all state-owned lakes having 50 acres or more and to charge the Department of Conservation and Development with administrative responsibility of these newly established recreation areas.

Settlers in the Bay Lakes region generally led lives of marginal subsistence. Due to an influx of laborers that worked in the naval stores, lumber, and cotton industries, the population increased beyond the soil's capacity to support it. With the decline of the cotton industry and the exhaustion of the tar, pitch, turpentine, and timber industries, a large segment of the population by 1935 found themselves on submarginal land with no means of moving into an area of greater productivity.

During the Great Depression years of the 1930s, the federal government undertook conservation programs to create jobs. These programs resulted in facilities being constructed at nearby Jones and Singletary lakes as well as the acquisition of 34,544 acres of land in the Bladen Lakes area. No land was acquired for public purposes at Bay Tree Lake, however, nor were any facilities constructed, and the state's property interest continued to be limited to the lake.

Prior to 1965, little use was made of Bay Tree Lake, mainly because of its inaccessibility. In January, 1965, a private land development group obtained an option to purchase several tracts of land consisting of approximately 14,000 acres completely surrounding Bay Tree Lake. The intent of the group was to develop a private, inland resort based on the 1,400-acre lake. Later that year, the group made an official request for the drainage of Black Lake to officials of the North Carolina Department of Conservation and Development. The proposal was aimed at



determining the feasibility of improving the quality of the water and lake bottom for recreational purposes.

Permission to lower the water level of Black Lake by four feet was granted in the fall of 1965, following the recommendations of the Wildlife Resources Commission. In January of 1966, the developers requested permission to completely drain the lake and clean out debris. The purpose of the operation was to remove all tannic waters from the lake and to intercept black water draining into the lake from adjacent swamp land by cutting a ditch around the complete circumference of the lake. Instead of draining into the lake, swamp waters were diverted to below the lake drain.

The developers' plan for improving Black Lake was based largely on the observations of scientists who had studied the bay lake phenomenon and the differences between the lakes; that is, that the main difference between the black water lakes and White Lake was that White Lake was the only bay lake draining to the northwest rather than the usual southeasterly pattern. It was observed that as a result of this difference, tannic waters and organic material were not carried across the lake but contained to the northwestern edge, thereby giving White Lake its clear water (State Lakes Master Plan, December, 1977).

Permission was granted to allow this project to be done under the supervision of the Division of State Parks and subject to the following conditions:

1. that plans for development of the area will include provisions for public access for full recreational use; and
2. that the water level be restored and constantly maintained at the normal high water mark subject only to natural causes (Twenty-First Biennial Report of the N.C. Department of Conservation & Development, June, 1960).

Drainage of the lake was completed in late February, 1966. Over the next five years, the lake remained dry while the developers removed stumps and lake debris and imported large quantities of white sand, which was distributed around the complete lake shore to cover existing organic material and form a new beach strand. By the middle of 1970, the drainage outlet was closed and the lake began refilling.

By early 1972, the lake had nearly reached its original level and remained clear. At a meeting of the Board of Conservation and Development, the name of Black Lake was officially changed to Bay Tree Lake, and the lake developers, Bay Lakes Corporation, announced extensive plans for the resort development. Included in the plans was a residential layout consisting of 3,000 single-family dwelling lots surrounding the lake, and multi-family residential and commercial facilities. Residential areas were shown to have direct access to either one of three golf courses or water frontage along the lake shore or canal system.

A mysterious breach of the lake rim occurred shortly after residential sales began. Tannic waters were allowed to enter the lake, and although the breach was repaired within 24 hours after its occurrence, it had the effect of returning the water to its original condition — approximating the color of tea. This condition remains to the present day.

Development of the lake shore and adjacent land has occurred on the northern side of the lake. Development includes clearing, residences, and a community center. A network of canals has also been dug on the northern and eastern shores for drainage and for recreational boat use.

In 1977, the Division of Parks and Recreation published a State Lakes Master Plan, which recommended development of recreational facilities at state lakes in this region. One of the objectives of the plan was to coordinate the recreational opportunities between lakes so that programs are complimentary. Use and development programs were viewed as being interrelated by proximity and environmental context.

The master plan calls for development of visitor facilities throughout the park. Much of the initial development calls for boating and parking facilities located near the southwest shore in an area that has already been heavily disturbed by ditching and draining, off-road vehicles, and logging. The remainder of development includes picnic areas, ranger housing, a visitor contact station, and a maintenance area. It is slated to be constructed in the pine flatwood communities west of the lake (State Lakes Master Plan, December 1977).

In two transactions that took place in 1979 and 1981, the Division purchased 609 acres of land, its first land acquisition at Bay Tree Lake. The property was included in a federal Land and Water Conservation Fund grant (project number 37-00688). Under federal regulations associated with the LWCF grant program, the land must be retained and used for public outdoor recreation purposes.

The 609 acres have remained undeveloped because of a lack of funds to develop and personnel to operate the area.





## II. PARK PURPOSES

### MISSION STATEMENT OF THE NORTH CAROLINA STATE PARKS

*The North Carolina state parks system exists for the enjoyment, education, health, and inspiration of all our citizens and visitors. The mission of the state parks system is to conserve and protect representative examples of the natural beauty, ecological features, and recreation resources of statewide significance; to provide outdoor recreation opportunities in a safe and healthy environment; and to provide education opportunities that promote stewardship of the state's natural heritage.*

### BAY TREE LAKE STATE PARK PURPOSE STATEMENT

Bay Tree Lake has a long history of public ownership. In 1827, legislation passed that prohibited the lands covered by the waters of any lake within North Carolina from being recorded for private ownership. In 1911, the General Assembly passed legislation declaring that certain lakes containing 500 acres or more were not to be sold but should "...always be and remain the property of the State of North Carolina for the use and benefit of all the people of the State." This legislation clearly indicates the public-trust nature of the 1,418-acre lake. While the lake and lake bed have been and remain public property, the lake shore above mean high water was privately owned until 1979 when 350 acres were acquired by donation as part of a Federal Land and Water Conservation Fund grant. LWCF regulations require that the 350 acres and lake be retained and used only for public outdoor recreation purposes.

Bay Tree Lake's natural and public trust values have been adversely affected by private development. Between 1965 and 1972, the lake was drained, stumps and lake debris were removed, and lakeside property was drained and cleared. White sand was distributed around the lake shore to cover organic material, and a drainage canal was dug around the entire lake to keep swamp water from entering the lake. Homes were constructed along its northern rim. A rim breach returned the lake to its original color.

Bay Tree Lake has the potential to be an outstanding recreational area. Its previously disturbed resources and its large size make extensive recreational use appropriate. Opportunities exist to provide public access and varied recreational activities such as swimming, boating, fishing, hiking, nature study, picnicking, and camping. Recreational activities should be compatible with one another and with the protection of the park's resources. They should not result in excessive noise and should provide for the education, health, and happiness of park visitors. Recreational development should also be coordinated to complement the outdoor recreation offered at other nearby state lakes.

Bay Tree Lake offers beautiful scenic vistas of its open waters and extensive undeveloped shoreline. The broad expanses of flat, dark water contrast with the dense bay forest. In places,



majestic bald cypress draped with Spanish moss line the shore or grow in the shallow water.

Bay Tree Lake State Park's significant biological resources include longleaf pine communities classified as Pine/Scrub Oak Sandhill, Wet Pine Flatwoods, and Mesic Pine Flatwoods. There are also well developed examples of pocosin vegetation. The longleaf pine canopy is unusually mature. While somewhat damaged by fire suppression, these communities are highly significant as examples of the more fertile longleaf pine communities that are very rare in the region.

Bay Tree Lake is classified as a Carolina bay. Carolina bays are found only in the loose, unconsolidated sands that form a cover within the Atlantic Coastal Plain in North Carolina, South Carolina, and Georgia, with the greatest concentration of bays in Bladen County. Carolina bays are shallow, oval depressions oriented in a southeast-northwest direction. Their origin has long been a matter of speculation and debate. Bay Tree Lake is an example of a water-filled Carolina bay. Only a few bays still contain water. It is shallow, with the deepest point being only 7.1 feet. Its outline is irregular for a Carolina bay; it appears to merge with neighboring bays. Bay Tree Lake's geological values have been lessened by earlier private development activities in and adjoining the lake.

Bay Tree Lake State Park exists so its valuable recreational, scenic, biological, and geological values can be protected and because of its value as a public trust resource. The Division is charged with preserving these values and providing park experiences that promote pride in and understanding of North Carolina's natural heritage.

### III. SUMMARY OF INTERPRETIVE THEMES

The 1987 State Parks Act defines the purposes of the state parks system. It establishes that:

*The State of North Carolina offers unique archaeologic, geologic, biologic, scenic and recreational resources. These resources are part of the heritage of the people of this State. The heritage of a people should be preserved and managed by those people for their use and for the use of their visitors and descendants.*

It further provides that:

*Park lands are to be used by the people of this State and their visitors in order to promote understanding of and pride in the natural heritage of this State.*

One of the best methods of fulfilling these purposes is through environmental education. The definition of environmental education as set forth in *The North Carolina Environmental Education Plan* is as follows:

*Environmental Education is an active process that increases awareness, knowledge and skills that result in understanding, commitment, informed decisions and constructive action to ensure stewardship of all interdependent parts of the earth's environment.*

Bay Tree Lake State Park has two primary interpretive themes and one secondary theme.

#### PRIMARY INTERPRETIVE THEMES

##### Origin of Carolina Bays

This interpretive theme focuses on some of the many theories that attempt to explain the origin of Carolina bays. Emphasis is placed on the physical characteristics of Carolina bays, particularly their geomorphology (shape, orientation, depth, etc.) and their water quality (pH, clarity, and temperature).

##### Carolina Bay Ecology

This interpretive theme focuses on the plant communities associated with the aquatic environment and the peat soils within the sand rim, and also on the plant communities associated with the mineral soils of the sand rim adjacent to the Carolina Bay. Key animal species are included. The role of fire in creating and maintaining habitat for the plants and animals of peat soil, mineral soil, and the ecotone or transition zone is also a part of the Carolina bay ecology.

## SECONDARY INTERPRETIVE THEMES

### Astronomy

This secondary theme identifies the major constellations and their stars, with emphasis on associated Native American legends.

## IV. PARK AND RECREATION DEMAND AND TRENDS

### VISITOR INFORMATION

In 1987 the U.S.D.A. Forest Service was contracted by the Department to conduct a Public Areas Recreation Visitors Survey (PARVS) of the North Carolina state parks system visitors in order to identify their socio-economic characteristics and economic contribution to the state's economy. While Bay Tree Lake was not one of the eight parks involved in the survey, some information concerning state park visitors in general was learned.

Why do people visit state park units? The convenient location was cited by 31 percent of the respondents; 25 percent thought other areas were too crowded; 21 percent liked the good facilities; 8 percent wanted to try a new area; 7 percent enjoyed the scenic beauty; and 6 percent came to see the attraction.

A good percentage of park visitors come from within a 30-mile radius (37 percent), while 17 percent come from 30 to 60 miles away. Park visitors surveyed indicated that the parks served as their sole destination 86 percent of the time. While most visitors come from nearby, the average one-way distance travelled was 139 miles.

Seventy-eight percent of those surveyed indicated that they were return visitors. The average number of return trips per year was six.

Sixty-one percent of visitors statewide came with family members, 16 percent with friends, and 7 percent with family and friends. Ten percent of visitors came alone. Visitors also came in small numbers in organized groups and multiple families. The average group size surveyed was 3.59.

PARVS data indicates that 16.8 percent of groups surveyed used more than one car, and that the average number of persons per car was 3.05. The average age of the park visitor was 38.24 years. The age distribution was as follows:

#### Percent of Visitors by Age Group

<u>Under 6</u>	<u>6-12</u>	<u>13-18</u>	<u>19-25</u>	<u>26-35</u>	<u>36-45</u>	<u>46-55</u>	<u>56-65</u>	<u>Over 65</u>
6.7	11.6	10.6	12.5	20.1	16.9	0.9	7.3	4.4

The PARVS information shown above is useful in providing a general assessment of the state park system's visitation as well as a general indication of likely visitation at Bay Tree Lake once the state park is opened.



PARVS data indicates that approximately 25 percent of state park visitation comes from out of state. PARVS data also indicates that out-of-state visitors averaged 4.1 trips per year to North Carolina state parks.

Since over 18 percent of visitors are under the age of 13, demand exists for children's programs and facilities. Approximately 12 percent of visitors are 56 and older. This older segment of the general population will be increasing, and as it does, demand for improved quality, accessibility, and safety should increase.

### POPULATION TRENDS

The primary service area of Bay Tree Lake State Park is identified as Bladen County, in which the park is located, and the surrounding counties of Columbus, Cumberland, Duplin, Pender, Robeson, and Sampson.

The total 1990 population of Bladen, Columbus, Cumberland, Duplin, Pender, Roberson, and Sampson counties was 574,142, 8.66 percent of the state's population. The region's population grew during the 1980s by 5.7 percent, less than half the 12.7 percent growth experienced by the entire state. Four of the region's seven counties — Bladen, Columbus, Duplin, and Sampson — actually lost population during the 1980s. Most of the region's growth took place in Cumberland and Pender counties (Figure IV-1).

According to the Office of State Budget and Management, outside of catastrophic events such as a depression or outbreak of a rapidly spreading, incapacitating disease, the most influential forces affecting the need for state services are the growth and shifts in population. The region's overall population growth rate is expected to slow during the 1990s, a trend also predicted for the state as a whole as in-migration from other states slows. Growth and shifts in the population of the region, therefore, are not expected to affect the State Lakes to any significant degree during the 1990s.

Population shifts in various age segments will also take place. Over the past 10 years, the number of women in their prime childbearing years has declined with the aging of the 1940s baby boomers, and the result has been a decline in births. The number of women in their late teens to middle thirties is projected to change little over the next 20 years. Assuming a stable childbearing rate, the number of children in the newborn to four-year-old category will remain stable.

Public-school-age population (5 to 17) has declined significantly during the past 10 years. It has now reached a plateau that is expected to continue. The college age (18 to 24) population has declined in recent years and is likely to continue its small decline before stabilizing at the end of the century. The percentage of the 18-to-34 population started to decline in 1990.

# POPULATION TRENDS 1980- 1990

## STATE LAKES AREA

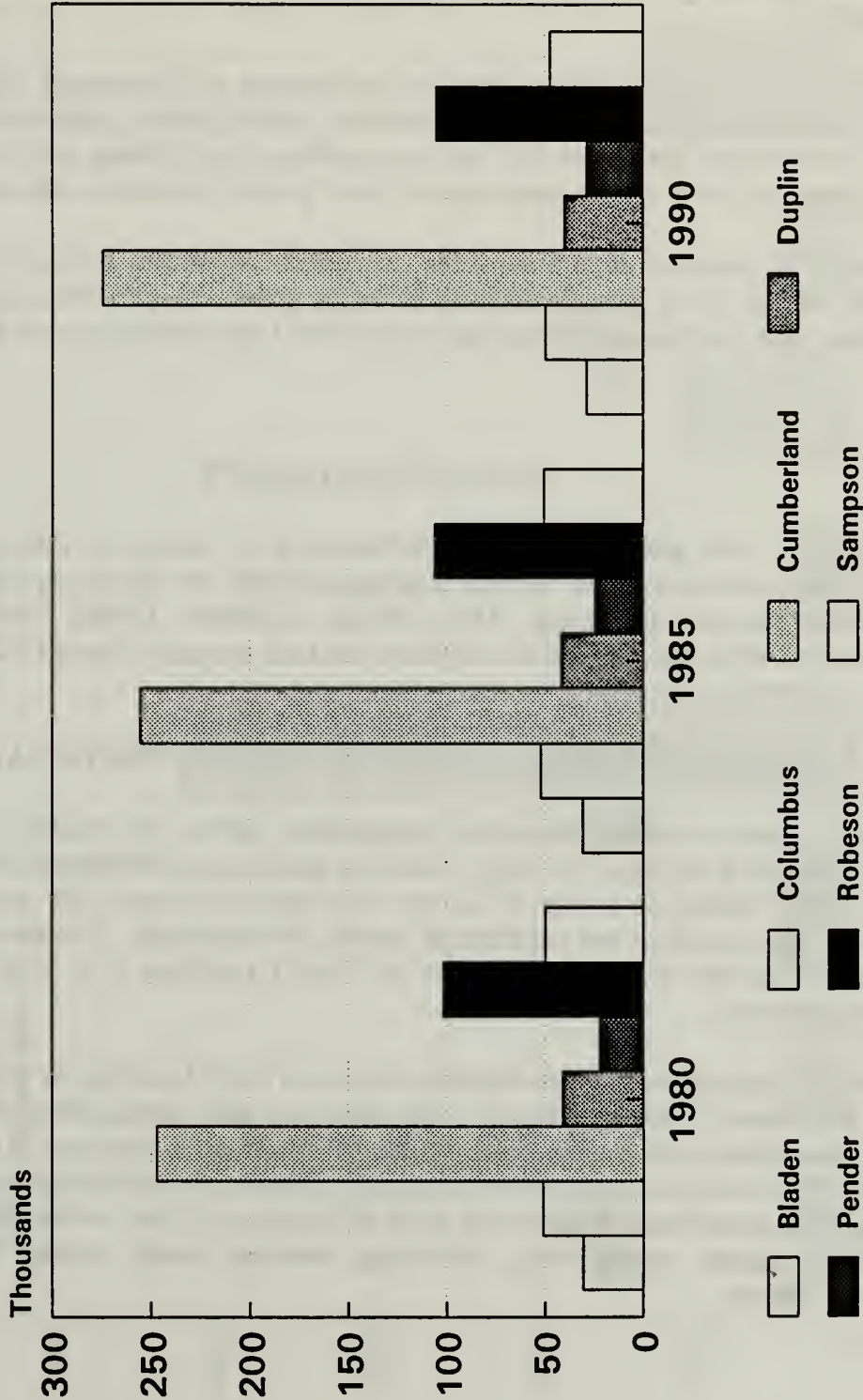


Figure IV-1. STLA Area Population Trends

In contrast, the growth in the middle-aged and elderly population during the next 20 years is a virtual certainty, thanks to the baby boom of the 1940s. The fastest-growing age segment over the next two decades will be the over-85 segment, followed by the 75-to-84 and then the 65-to-74 segments.

Over the past 10 years, the elderly population has become an increasingly vital political force. For the short-term future, it is anticipated that the growing elderly population will confine its demands primarily to health, nursing homes, activities of daily living, and protective services. Numerous surveys have shown these areas to be of primary concern to the elderly.

While shifts in population age groups are particularly significant in school and some social programs, the age-group changes that will be taking place will not have a significant effect on the planning and construction of facilities at Bay Tree Lake State Park over the next five to 10 years.

### **POPULATION DENSITY**

The Bay Tree Lake State Park primary service area is, except for Cumberland County, a predominantly rural area. The region's population density (95 people per square mile) is well below that of the state as a whole (136). Bladen, Columbus, Duplin, Pender, and Sampson counties' population densities are all far below the state average (Figure IV-2).

### **OUTDOOR RECREATION PARTICIPATION IN NORTH CAROLINA**

The North Carolina Outdoor Recreation Participation Survey was mailed to 3,100 randomly selected residents in the spring of 1989. Forty-five percent, or 1,399 people, returned completed surveys. Each person receiving the survey was asked to estimate the number of times the members of his household had participated in each of 43 activities. The survey results provide good insight into the current participation of North Carolinians in a wide range of outdoor recreation activities.

The five most popular outdoor recreational activities in North Carolina are walking for pleasure, driving for pleasure, viewing scenery, beach activities, and visiting historical sites. Three out of every four households participated in walking for pleasure at least once in the past 12 months (Table IV-1). In addition to the five most popular activities, over fifty percent of the households that responded participated at least once in the following activities: swimming (in lakes, rivers, or oceans), visiting natural areas, picnicking, attending sports events, visiting zoos, and freshwater fishing.



# 1990 POPULATION DENSITY

## STATE LAKES AREA

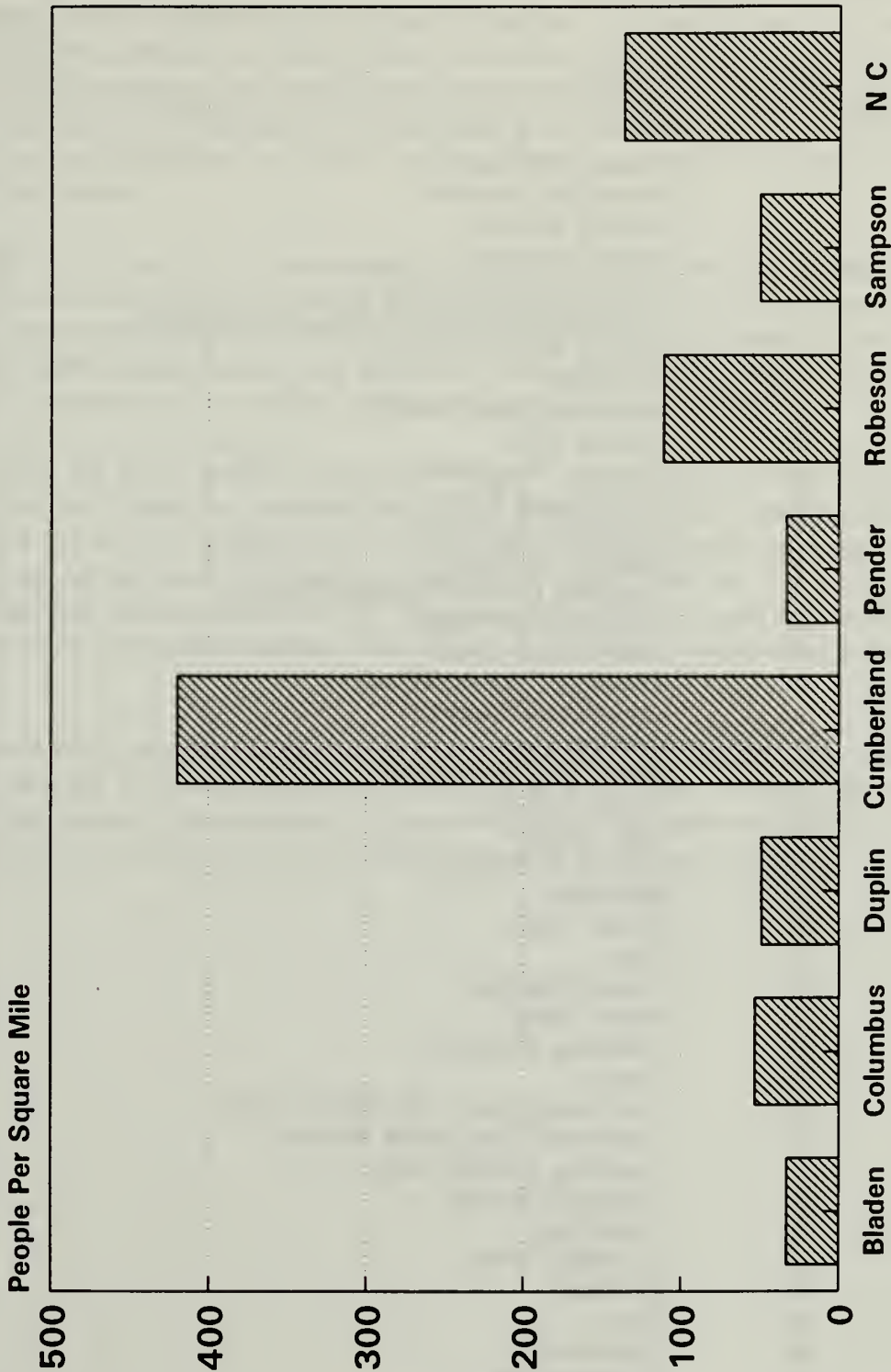


Figure IV-2.STLA Area Population Density

Table IV-1. Outdoor recreation activities ranked by popularity.

Rank	Activity	Percentage of Households Participating
1.	Walking for Pleasure	75 %
2.	Driving for Pleasure	72
3.	Viewing Scenery	71
4.	Beach Activities	69
5.	Visiting Historical Sites	62
6.	Swimming (in Lakes, Rivers, and Oceans)	54
7.	Visiting Natural Areas	53
8.	Picnicking	52
9.	Attending Sports Events	52
10.	Visiting Zoos	51
11.	Fishing - Freshwater	50
12.	Use of Open Areas	41
13.	Swimming (in Pools)	40
14.	Fishing - Saltwater	38
15.	Attending Outdoor Cultural Events	35
16.	Bicycling for Pleasure	32
17.	Other Winter Sports	31
18.	Camping, Tent or Vehicle	29
19.	Softball and Baseball	28
20.	Hunting	28
21.	Use of Play Equipment	28
22.	Power Boating	26
23.	Trail Hiking	26
24.	Jogging or Running	24
25.	Basketball	24
26.	Nature Study	22
27.	Golf	22
28.	Target Shooting	20
29.	Water Skiing	19
30.	Camping, Primitive	14
31.	Tennis	14
32.	Use Motorcycles, Dirt Bikes, ATV's	13
33.	Use Four Wheel Drive Vehicles	13
34.	Canoeing and Kayaking	13
35.	Horseback Riding	12
36.	Volleyball	12
37.	Downhill Skiing	12
38.	Football	11
39.	Soccer	7
40.	Sailboating	7
41.	Skateboarding	6
42.	Cross Country Skiing	2
43.	Windsurfing	1

## **PRIORITIES OF PUBLIC OUTDOOR RECREATION FUNDING**

The North Carolina Outdoor Recreation Survey asked residents a series of questions in order to identify and rank future demand for public outdoor recreation. Future demand was determined by asking them which activities they would have tried more often had adequate facilities been available. Respondents were then asked to rank these activities in order of importance. A scoring system was used assigning each activity a rating of high, moderate or low future demand based on the survey results.

In the second part of the analysis, the respondents' level of support for publicly funded outdoor recreation activities was determined by asking them to identify and rank those activities to which government should give highest priority when spending public money. The same scoring system used to analyze unmet demand was then applied to the survey results, with each activity receiving a high, moderate or low rating in public support for public funding.

In the final part of the needs analysis, the two ratings for each activity were combined to produce a score of one to nine that reflected both future demand and public funding priorities. The activities that ranked high in both future demand and support for public funding received the highest priority in the needs assessment. Support for public funding was given higher priority than expressed demand (Table IV-2). Based on this analysis, many of the activities rated as high and moderate priorities are activities that could potentially be provided at Bay Tree Lake State Park.

Initial development being proposed for Bay Tree Lake is described in Chapter VII of this plan. Recreation that will be provided includes picnicking, beach activities, fishing, use of play equipment, viewing scenery, and swimming. These activities are consistent with public funding priorities identified in the North Carolina Outdoor Recreation Participation Survey.

**Table IV-2. Public Priorities for Future Outdoor Recreation Activities**

Activity	Code	Future Demand	Support for Public Funding
Walking for Pleasure	1	High	High
Camping, Tent or Vehicle	1	High	High
Picnicking	1	High	High
Beach Activities	1	High	High
Fishing - Freshwater	1	High	High
Attend Outdoor Cultural Events	1	High	High
Visiting Natural Areas	2	Moderate	High
Use of Play Equipment	2	Moderate	High
Visiting Zoos	2	Moderate	High
Visiting Historical Sites	2	Moderate	High
Bicycling for Pleasure	3	High	Moderate
Swimming (in Pools)	3	High	Moderate
Viewing Scenery	4	Moderate	Moderate
Hunting	4	Moderate	Moderate
Trail Hiking	4	Moderate	Moderate
Use of Open Areas	4	Moderate	Moderate
Target Shooting	4	Moderate	Moderate
Swimming (Lakes, Rivers, Ocean)	4	Moderate	Moderate
Fishing - Saltwater	4	Moderate	Moderate



## **AREA OUTDOOR RECREATIONAL OPPORTUNITIES**

There are six state park units within a 50-mile radius of Bay Tree Lake. Five of these park units — Bushy Lake State Natural Area, Jones Lake State Park, Lake Waccamaw State Park, Singletary Lake State Park, and White Lake State Lake — also contain Carolina bays. The Lumber River State Park is the other nearby state park. A brief description of these state park units follows.

### **Bushy Lake State Natural Area, Cumberland County**

Bushy Lake is an excellent example of a "low bay," with its interior having the appearance of an open savannah with scattered trees, shrubs, and a variety of grasses. Although not a lake, it does contain shallow water much of the year, as well as several small ponds. Limited access is provided for low-intensity recreational use such as nature observation, hiking, and environmental education and research.

### **Jones Lake State Park, Bladen County**

Jones Lake State Park contains two Carolina bays, the 224-acre Jones Lake and the 315-acre Salters Lake. Its outstanding biological resources include high quality aquatic and shoreline communities typical of bay lakes. The state owns the entire shoreline of both lakes. Swimming, hiking, picnicking, camping, fishing, boating, and nature study are offered.

### **Lake Waccamaw State Park, Columbus County**

Lake Waccamaw is the second largest Carolina Bay lake in North Carolina, containing 8,938 acres. It is a unique habitat that is home to several species of fish, clams, and snails found nowhere else in the world. The 1,732-acre land base includes longleaf pine ridges, wet pocosins, pine savannas, and swamp forests. Park facilities are limited, but include a picnic area and swimming pier.

### **Lumber River State Park — Scotland, Hoke, Robeson, and Columbus Counties**

Lumber River State Park, created in 1989, is in an early state of development. The state park and state river stretch 110 miles from state road 1412 in Scotland County to the North Carolina-South Carolina state line. The slow-moving blackwater river offers opportunities for canoeing, boating, and fishing. Facilities are currently being developed on land located south of US 74 in Robeson County. The master plan calls for picnicking areas, family camping, trails, river access areas, and support facilities.

### Singletary Lake State Park, Bladen County

Singletary Lake State Park contains 1,221 acres of land and water. The park land completely surrounds the 572-acre Carolina bay. The park has two group camps that are available for rent to non-profit youth and adult organizations. The camps provide a setting for unique camping experiences by offering organized groups overnight interpretation and education and extended stay recreation in a peaceful, natural setting. Fishing is offered to the public on a limited basis.

### White Lake, Bladen County

White Lake State Lake is a 1,068-acre Carolina Bay. The state owns only a .6-acre access on the southern shoreline. This lot provides staff access to the lake and a place to dock the Division's patrol boat. No public access areas at the lake are operated by the Division. Almost the entire shoreline is privately developed, and the lake is heavily used for recreational boating.

**Table IV-3. Road Mileage Between State Lakes**

	Bay Tree Lake	Bushy Lake	Jones Lake	Salters Lake	Singletary Lake	Lake Waccamaw	White Lake
Bay Tree Lake	X	30.7	12.2	14.7	12.2	51	5.5
Bushy Lake	30.7	X	18.5	16	32	60.4	25.2
Jones Lake	12.2	18.5	X	2.5	13.4	42	6.7
Salters Lake	14.7	16	2.5	X	16	44.4	9.2
Singletary Lake	12.2	32	13.4	16	X	52	6.7
Lake Waccamaw	51	60.4	42	44.4	52	X	45.4
White Lake	5.5	25.2	6.7	9.2	6.7	45.4	X

In addition to state park system units, there are other public areas used for outdoor recreation located in the Bay Tree Lake area.

### Bladen Lakes State Forest, Bladen County

The state-owned Bladen Lakes State Forest covers over 31,000 acres, including land around Jones, Singletary, and Salters lakes. In addition to building up the growing stock of timber on previously over-cut and burned out areas, the forest also serves to provide recreation including group camping and hunting. The forest is an officially designated state game land, called the Bladen Lakes Game Land. The forest is also used for educational purposes, particularly the demonstration of forestry management practices.

### North Carolina Game Lands

In addition to the Bladen Lakes Game Land mentioned above, two other large game lands lie within 50 miles of Bay Tree Lake State Park. They are the 13,295-acre Green Swamp Game Land, located in Brunswick County approximately three miles north of Supply, and the 1,585-acre Sutton Lake Game Land, in New Hanover County. The Green Swamp Game Land is leased from the Nature Conservancy and the Sutton Lake Game Land from Carolina Power & Light Company.

### Boat Registration Trends

Boating registrations in the state lakes region more than tripled in the 20 years from 1973 to 1993. The rate of growth for the whole state was slightly slower.

**Table IV-4. Boating Registration Trends 1973-1993.**

	1973	1978	1983	1988	1993
Bladen County	336	1,033	977	1,438	1,343
Columbus County	1,113	3,090	2,864	3,706	3,649
Cumberland County	2,642	4,771	4,443	7,081	6,405
Duplin County	336	1,202	1,018	1,343	1,369
Pender County	487	1,524	1,593	2,145	2,134
Robeson County	859	2,226	2,143	3,995	4,009
Sampson County	326	973	936	1,503	1,541
State Lakes Region	6,199	14,819	13,974	21,211	20,450
North Carolina	104,147	192,197	194,940	259,548	296,051



## BOATING CAPACITY

All types of boating can be expected once the state constructs a boat ramp at Bay Tree Lake. Statewide, 26 percent of households participate in power boating and 19 percent in waterskiing annually. These activities ranked 22nd and 29th, respectively, in popularity (Table IV-1), but they were not viewed by survey participants as public recreation priorities (Table IV-2).

White Lake, only 5.5 miles away, is already over-crowded at times, particularly on summer weekends and holidays. Bay Tree Lake can be expected to absorb some of the current use that White Lake receives and to generate new boating use as well. Care should be taken to prevent the overuse of Bay Tree Lake. Establishing optimum boating carrying capacity for the lake is needed to avoid overuse in the future.

Carrying capacities or standards attempt to set a use level that is most appropriate to balance both resource protection and the satisfaction and safety of participants. No standards have been adopted by North Carolina state agencies, but standards used by other states and federal agencies may be used as a guide.

The U.S. Army Corps of Engineers has used the following standards, adopted from those originally published by the Bureau of Outdoor Recreation in 1977:

- unlimited power boating with skiers** — 12 acres per boat
- limited (under 10 h.p.) boating** — 4.3 acres per boat
- sailboats** — 4.3 acres per boat
- non-power boating** — 1.3 acres per boat

The U.S. Department of Agriculture Soil Conservation Service has used the following standards:

- anchored fishing boats** — 4 to 7 boats per acre
- trolling fishing boats** — 2 to 4 boats per acre
- power and sail boats** — 3 acres per boat (excluding 300 ft. shore zone)
- water skiing** — 5 acres per boat (excluding 300 ft. shore zone)

The state of Wisconsin's standards are as follows:

- water skiing** — 20 acres per boat
- boating** — 20 acres per boat

Louisiana has used the following standards:

- power boating** — 20 acres per boat
- water skiing** — 40 acres per boat

Applying the above standards to Bay Tree Lake's gross water acreage results in the optimum carrying capacities shown in Table IV-4.

Table IV-5. Optimum Carrying Capacities Using Various Standards

ACTIVITY	CORPS OF ENGINEERS	SOIL CONSERVATION SERVICE	WISCONSIN	LOUISIANA
Water Skiing	118 boats	246 boats	71 boats	35 boats
Unlimited boating	158 boats	410 boats	71 boats	71 boats
Small (< 10 hp) boating	329 boats	—	—	—
Non-power boating	1,090 boats	—	—	—
Sailboats	329 boats	410 boats	—	—
Jet Skiing	—	—	—	—

Of course, a mixture of boating activities will take place at any one time, so any carrying capacity established would need to reflect such usage. For example, if half the usage were water skiing and half power boating, the optimum capacity would be 134 boats (using Corps of Engineer standards).

One method of limiting boating use so that carrying capacity is not exceeded is to limit the size of the Bay Tree Lake State Park boat ramp and boat parking area. Private boating access already exists, however, so limiting the size of the state park boating access area will not ensure that boating capacity is not exceeded.

Any establishment of a boating carrying capacity at Bay Tree Lake must consider that the lake is very shallow and that much of it may therefore be unsuitable for power boating and water skiing. The lake has a maximum depth of six feet, and much of the lake is far shallower. Bay Tree Lake's 32 existing piers also serve to reduce the lake area available for boating.

In addition to the obvious problems shallow water presents for boaters, such as boats and propellers hitting bottom and injury to skiers, there are environmental concerns as well. White Lake has had problems for years with the smell and unsightliness of decaying vegetation that litters its beaches. The vegetation comes from relatively fragile plants whose stems become broken, dislodged, and fragmented, particularly during periods of intensive power boating use. The effective mixing depth of a 50 horsepower motor reaches 15 feet below the surface, so all of the vegetation in Bay Tree Lake would be subject to disturbance with power boat use. Research is needed to determine what effect expanded power boating use would have on the vegetation and fisheries at Bay Tree Lake.

No boating carrying capacity for Bay Tree Lake can be set until further studies of the many variables affecting boating capacity are made. Until such time, the state should proceed conservatively with its development plans.





## V. SUMMARY OF LAWS GUIDING PARK MANAGEMENT

There are many federal and state statutes, state and federal executive orders, and administrative rules and policies that govern the operation of the state parks system. This chapter includes a brief discussion of the primary legal basis for the existence and operation of the state parks system and Bay Tree Lake State Park. The definitions of and Departmental duties concerning state-owned lakes are found primarily in Chapters 113 and 146 of the North Carolina General Statutes. Those chapters deal with natural resource conservation and development, and state real property, respectively.

### STATE LEGAL MANDATES

#### North Carolina Constitution

Article XIV, Section 5 of the North Carolina Constitution sets overall policy by broadly defining the conservation and protection of natural resources and the acquisition of such resources as a proper function of government. The amendment reads in part as follows:

*It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivision to acquire and preserve park, recreation, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this state its forests, wetlands, estuaries, beaches, historical sites, open land, and places of beauty.*

#### State Parks Act

The State Parks Act (G.S. 113-44.7 through 113-44.14) sets forth a mission statement for the state parks system. It states that the system functions to preserve and manage representative examples of significant biological, geological, scenic, archaeological, and recreational resources, and that park lands are to be used by the people of the state and their visitors and descendants in order to promote understanding of and pride in the state's natural heritage.

The State Parks Act also calls for development and periodic revisions of a System Plan to achieve the mission and purpose of the state parks system in a reasonable, timely, and cost-efficient manner. The Act describes System Plan components and requires that public participation be a component of plan development and revisions.

The State Parks Act also calls for the classification of park resources and development of general management plans (GMPs) for each park. GMPs are to include a statement of park purpose, an analysis of major resources and facilities, and a statement of management direction.

## Powers and Duties of the Department of Environment, Health, and Natural Resources

The Department is authorized to make investigations of the resources of the state and to take such measures as it may deem best suited to promote the conservation and development of such resources. In addition, the Department may care for state forests and parks and other recreational areas now owned, or to be acquired by, the state. (G.S. 113-8)

### State Nature and Historic Preserve Dedication Act

The State Nature and Historic Preserve Dedication Act (G.S. 143-260.6) was authorized by Article 14, Section 5 of the North Carolina Constitution. It seeks to ensure that lands and waters acquired and preserved for park, recreational and scenic areas for the purpose of controlling and limiting the pollution of air and water, controlling excessive noise, and in every other appropriate way preserving as a part of the common heritage of the state, continue to be used for those purposes. The State Nature and Historic Preserve therefore provides a strong legal tool for protecting lands from incompatible uses.

The addition and removal of lands to and from the State Nature and Historic Preserve require a law enacted by a vote of three-fifths of the members of each house of the General Assembly.

All land and water within the boundaries of Bay Tree Lake State Park as of April 4, 1989, is included in the State Nature and Historic Preserve.

### North Carolina Environmental Policy Act of 1971

Recognizing the profound influence that man's activity has on the natural environment, the General Assembly passed the Environmental Policy Act "*to assure that an environment of high quality will be maintained for the health and well-being of all...*"

The Act declares that:

*It shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony. Further, it shall be the policy of the State to seek, for all its citizens safe, healthful, productive, and aesthetically pleasing surroundings; to attain the widest possible range of beneficial uses of the environment without degradation, risk to health or safety; and to preserve the important historic and cultural elements of our common inheritance. (G.S. 113A-3)*

While there are other General Statutes that concern the state parks system and the environment, the above-described statutes, along with Article XIV, Section 5, of the North Carolina Constitution, largely define the purposes of the state parks system and serve to guide the operation of state park system units.

## **State Lakes Legislation**

The North Carolina General Assembly in 1911 passed legislation declaring that certain lakes containing 500 acres or more, including the 1,418-acre Bay Tree Lake, were not to be sold or conveyed, but should:

*... always be and remain the property of the State of North Carolina for the use and benefit of all the people of the State. (1911, c.8)*

That legislation and similar legislation passed in 1929 that lowered the acreage for state lakes to 50 acres clearly indicated the public trust nature of state lakes. Managing state lakes as a public trust resource includes the prevention of unlawful private encroachment on attendant public rights.

## **Construction of Structures**

A permit is required in order to erect any dock, pier, pavilion, boathouse, bathhouse, or other structure upon the floor of, or in or upon, the waters of any state lake (G.S.146-13). The Department of Administration has delegated the Division of Parks and Recreation as the permitting agency.

## **Recreational Use of State Lakes**

Recreation in, upon, or above any state lake may be regulated in the public interest by the Division of Parks and Recreation (G.S. 146-18). The Wildlife Resources Commission (WRC) is charged with regulating hunting and fishing. Fishing is allowed in state parks, and all WRC regulations apply. Hunting is prohibited in state park system units.

## **Control Over Parks**

General Statute 113-36 authorizes the Department to make reasonable rules for the regulation of the use by the public of state parks and state lakes. It authorizes the Department to construct and operate within state parks and state lakes and any other areas under its charge suitable public service facilities and conveniences and charge and collect reasonable fees for their use. It also authorizes the granting of concessions to private individuals or companies.

## **Dredging and Filling**

The Department has jurisdiction over any excavation or filling project begun in any state-owned lakes (G.S.113-229). The dredge-and-fill statute provides detailed conditions and procedures necessary to process and issue a permit. It also addresses permit compliance. Questions regarding dredging and filling should be directed to the Division of Coastal Management in Wilmington, North Carolina (919-395-3900).



## **FEDERAL LAWS**

### **Land and Water Conservation Fund Act of 1965**

The federal Land and Water Conservation Fund Act (PL 88-578) offers protection and places restrictions on fund-assisted outdoor recreation areas.

By virtue of receiving LWCF grant assistance, most of the state parks system, including all of Bay Tree Lake State Park at the time of completion of the LWCF grant in December 1984 is subject to LWCF rules and regulations. Property acquired or developed in whole or in part with LWCF assistance cannot be converted to other than public outdoor recreation use without federal approval. A conversion may only take place if approved by the secretary of the Interior, and only then if replacement property of equal fair market value and reasonably equivalent usefulness and location is substituted.

LWCF requirements include: programming, operating, and maintaining areas in a manner that encourages public participation; maintaining the property so it appears attractive and inviting to the public; maintaining property, facilities and equipment to provide for public safety; keeping facilities, roads, trails and other improvements in reasonable repair throughout their lifetime to prevent undue deterioration and encourage public use; keeping the park and facilities open for use at reasonable hours and times; and making future development meet LWCF rules and regulations. LWCF-assisted sites are periodically inspected by state and federal inspectors to ensure compliance with LWCF requirements.

### **Clean Water Act**

Bay Tree Lake State Park has extensive wetland areas. In addition to being protected by the state's dredge-and-fill statutes, these sensitive areas also receive some protection from Section 404 of the federal Clean Water Act. The waters of Bay Tree Lake, including its wetlands, are waters of the United States within the meaning of the Clean Water Act, and, thus, any dredging or filling in the waters of Bay Tree Lake may require permitting by the U.S. Army Corps of Engineers. Activities in wetlands for which permits may be required include, but are not limited to: placement of fill material; ditching activities; land clearing involving relocation of soil material; land leveling; most road construction; and dam construction (33 USC 1344). The Division will avoid undertaking construction located in wetlands unless there is no practical alternative and all practical measures are taken to minimize harm to the wetland.



## STATE LAKES MASTER PLAN

A State Lakes Master Plan, which included Bay Tree Lake State Park, was completed in 1977. The plan serves as a guide for development and management of park resources. It includes an analysis of cultural and natural resources as well as site analysis and development recommendations.

The master plan still serves to guide overall park development. During the general management plan process, the existing master plan was reviewed to determine if master plan proposals are still valid or if modifications are needed. GMP evaluation determined that the development concept was still valid, but that some changes to the master plan are needed. Construction changes are detailed in Chapter VII and land acquisition changes in Chapter IX.



## VI. NATURAL AND CULTURAL RESOURCE MANAGEMENT

### NATURAL RESOURCE MANAGEMENT POLICY

The Division of Parks and Recreation's approach to natural resource management is directed by the North Carolina Constitution and the State Parks Act, both of which require the prudent management of natural resources. The constitution sets the overall policy by broadly defining the conservation and protection of natural resources and the acquisition of such resources as a proper function of government. The State Parks Act states that unique archaeological, geological, biological, scenic, and recreational resources are a part of the heritage of the people that *"...should be preserved and managed by those people for their use and for the use of their visitors and descendants."*

The North Carolina state parks system plays an important role in maintaining, rehabilitating, and perpetuating the state's natural heritage. The natural resources of the state parks system are: high quality, rare, or representative examples of natural communities; native plants and animals; geological features and landforms; water resources; and the natural processes that affect these resources. The primary objective in natural resource management will be the protection of natural resources for their inherent integrity and for appropriate types of enjoyment while ensuring their availability for future generations.

It is the Division's policy that natural resources will be managed by allowing natural environments to evolve through natural processes with minimal human influence. Natural resource management will not attempt solely to preserve individual species or processes; rather, it will attempt to maintain all the components and processes of a park's naturally evolving ecosystems. When intervention is necessary, direct or secondary effects on park resources will be minimized to the greatest extent possible. Intervention of natural processes may occur:

- 1) to correct or compensate for the previous human disruption of natural processes;
- 2) to protect, restore, or enhance rare species;
- 3) to protect, restore, or enhance significant archaeological resources;
- 4) to construct, maintain, improve, or protect park facilities; and
- 5) to prevent danger to human health or safety.

All park facilities will be designed, constructed, and maintained to avoid adverse impacts to high quality natural communities, rare plant and animal species, major archaeological sites, and other natural and cultural resources.

## NATURAL COMMUNITIES

A natural community is defined as "*a distinct and reoccurring assemblage of populations of plants, animals, bacteria, and fungi naturally associated with each other and their physical environment.*" The descriptions of the communities found at Bay Tree Lake State Park follow the *Classification of the Natural Communities of North Carolina: Third Approximation* (Schafale and Weakley, 1990).

### Xeric Sandhill Scrub

This community type occurs on the coarse, deep sands of ridge and swale systems; it is frequently found along the exposed and very dry rims of Carolina Bays. It is the driest community type that occurs on the coastal plain, and the canopy is typically open and dominated by sparse stands of longleaf pine (*P. palustris*). The subcanopy is usually sparse and is frequently dominated by turkey oak (*Q. laevis*). The shrub layer is also sparse and is frequently dominated by dwarf huckleberry (*Gaylussacia dumosa*).

Although these communities usually produce too little fuel to sustain frequent high intensity fires, low intensity fires are known to have been characteristic throughout the coastal plain, and these fires helped to define these communities. Frequent fires kept the canopy sparse and open and prevented turkey oaks from invading and becoming larger and more dense. Fire has been excluded from this area for several decades, and turkey oak is now very prevalent. This community type is believed to have been widespread in the coastal plain, but most sites have been lost or altered due to fire suppression or logging. Because longleaf pine is slow to recolonize disturbed sites, large high-quality examples of this community type are now rare.

This community type is found at Bay Tree on the higher parts of the gently rolling uplands around the lake's sand rim. The canopy is fairly dense and is dominated by longleaf pine. The canopy is unevenly aged, with dominant trees averaging 12 inches in diameter and the largest trees approaching 17 inches in diameter. The understory is heavily shaded and is dominated by sparse turkey oak, sand post oak (*Q. margaretta*), and bluejack oak (*Q. incana*). The ground cover is also sparse and is dominated by wiregrass (*Aristida stricta*), wax myrtle (*Myrica cerifera*), dangleberry (*Gaylussacia frondosa*), and poison oak (*Toxicodendron toxicarium*).

Although this community type's structure is typically fire dependent, there is no evidence throughout the area of recent fire, and the litter component is thick. Overall, this community is in good condition, although the most exposed portions along the sand rim have been heavily disturbed by the extensive use of four-wheel drive vehicles.

### Mesic Pine Flatwoods

This community type generally occurs on flat or nearly flat areas that may become seasonally wet or dry. The canopy is generally dominated by longleaf or loblolly pine, and it frequently grades into Pond Pine Woodland or Xeric Sandhill Scrub along its margins. The understory is usually sparse, but is frequently dominated by invading turkey oaks. The shrub layer varies



is usually sparse, but is frequently dominated by invading turkey oaks. The shrub layer varies in density, and common species include inkberry (*Ilex glabra*), blue huckleberry (*G. frondosa*), swamp red bay (*Persea palustris*), and sweetbay (*Magnolia virginiana*). This is another fire-maintained community that relies on frequent, low-intensity fires to maintain its open canopy and sparse subcanopy.

Approximately 90 acres of Mesic Pine Flatwoods occur on the eastern side of the park, adjacent to the north and eastern sides of Causeway Bay. These stands are well developed and are dominated by mature longleaf pines that approach 75 feet in height and 17 inches in diameter. The canopy is sparse to fairly dense. Turkey oak dominates the understory and is generally sparse, although it is well developed in some areas, reaching heights of 15-20 feet. Southern red oak (*Q. falcata*) also occurs in the understory. Young, second-growth longleaf saplings are numerous. Ground cover is generally sparse and includes wiregrass, common broomsedge (*Andropogon virginicus*), and little bluestem (*Schizachyrium scoparium*).

This community type's vegetation is fire dependent, but fire has been suppressed throughout the area for several decades. The litter component is now very thick throughout this community, and the invading scrub oaks have become much more prominent than would be expected if the normal fire regime were in place. Fuel levels are quite high in some places. Approximately 40 acres were burned with prescribed fires in May 1994, and the initial results indicate that the area tolerated the fires very successfully. Much of the smaller invading scrub oaks appear to have been killed, and the dominant pines survived the surface fires with little mortality. Additional burn units have been identified throughout the community, and a program of periodic controlled burns should be initiated throughout the remainder of the community as soon as possible.

## NATURAL HERITAGE PROGRAM ELEMENT OCCURRENCES

### Mimic Glass Lizard (*Ophisaurus mimicus*)

This animal is known to occur in pine flatwoods communities. It has been assigned Special Concern status by the North Carolina Wildlife Commission, meaning that it is a legally protected species. Even though it is rare enough to warrant such protection, however, any species with this status can still be collected in the wild and sold under regulations outlined in Article 25, Chapter 113 of the North Carolina General Statutes. The only park record for this species dates from 1970, and it is very sketchy, noting only that its location "...may be in Bay Tree Lake State Park."

### Carolina Gopher Frog (*Rana capito capito*)

This amphibian breeds in temporary pools and forages in sandy woods, especially in pine-oak-dominated sandhills. It has been assigned Special Concern status by the Wildlife Resources Commission. There are two records from the park area for this species, the first from 1957, the second from 1960. Staff from the Natural Heritage Program think that both records may

## **NATURAL RESOURCE MANAGEMENT ISSUES**

### **Natural Resource Inventories**

A comprehensive, updated natural heritage survey is needed for the park. The survey should include systematic inventories of all plant and animal species. The inventories would provide the baseline data needed for a natural resources monitoring program and could also provide for expanded I&E programming. An emphasis should be placed on determining the location and status of the park's rare species.

### **Fire Management**

Fire has played an important historical role in shaping the park's landscape, and the park has a fire management plan that calls for the use of prescribed fire in 10 burn units covering 98 acres. Most of these units support pine flatwood communities; there is one unit with pocosin vegetation and one broomstraw field with scattered loblolly and longleaf pines. The park's fire management plan was updated in 1994 as part of the fire management plan at Singletary Lake State Park. Approximately 40 acres of pine flatwood communities were successfully burned in May 1994 as part of an ecological burning workshop sponsored by The Nature Conservancy. The burn plan's primary ecological objectives are:

- 1) To reintroduce fire and reduce fuel loads in the park's fire-adapted ecosystems.
- 2) To restore and maintain the park's fire adapted communities, including Xeric Sandhill Scrub, Pine Flatwoods, and areas of pocosin vegetation.

The prolonged suppression of fire throughout the region has produced abnormally high fuel loads and threatens to significantly alter vegetation patterns across the park. Hardwood invasion is already altering the understory component in the pine flatwood communities and threatens to shade out second growth longleaf pines. Litter levels are very high, and many turkey oaks are now tall enough to carry flames up into the canopies of some pines. The reintroduction of fire in May 1994 was very successful, and the continued periodic use of prescribed fire will reduce fuel loads and allow the park's fire-dependent communities to function more normally.

### **Damage From Four Wheel Drive Vehicles**

Although Bay Tree has no visitor facilities, there is an unpaved road along the sand rim that provides access to the lake's shore. There is a gate on this road at the park boundary, but local residents hauling boats to the lake either break it down or simply drive around it when it is repaired. The park is also popular with owners of four-wheel-drive and other off-road vehicles; the area along the sand rim at the southwest end of the lake has been particularly hard hit by four-wheel-drive vehicles. Patrol and law enforcement are the responsibilities of Singletary Lake State Park staff, but because of staff and time limitations, they are able to patrol at Bay Tree only on

the area along the sand rim at the southwest end of the lake has been particularly hard hit by four-wheel-drive vehicles. Patrol and law enforcement are the responsibilities of Singletary Lake State Park staff, but because of staff and time limitations, they are able to patrol at Bay Tree only on an infrequent basis. As the staff situation improves, a more constant uniformed presence by field staff may help to curtail off-road vehicle use.

### **Master Plan Facilities**

The park's master plan calls for the development of visitor facilities throughout the park. Much of the initial development will involve boating and parking facilities and is slated to occur near the southwest shore. Much of this area, including most of the sand rim, has been heavily disturbed by ditching and draining, off-road vehicles, and logging. Also, the lake has been drained in the past, so its aquatic communities have been highly disturbed. Therefore, development in this area is not likely to result in adverse impacts to any high quality natural communities or rare species. The remainder of the development, including picnic areas, ranger housing, a visitor contact station, and a maintenance area, is slated to occur in the pine flatwood communities west of the lake shore area. All of this area is a fire prone/dependent community, and great care needs to be taken to ensure that the park's well developed longleaf pine communities are affected as little as possible. Virtually all of the park's pine flatwoods are included in burn units, and development sites should be chosen with regard to the fire management plan's objectives and boundaries.

### **Resource Management Plan**

A comprehensive, park-specific resource management plan addressing these and future issues needs to be developed. This plan should include detailed actions whose implementation will prevent or correct threats or damage to the park's natural resources. The addition of a district resource management specialist would facilitate the development and implementation of this plan.







## **VII. PHYSICAL PLANT INVENTORY**

### **BAY TREE LAKE ROAD INVENTORY**

#### **Existing Conditions**

According to the study of state park roads completed in March 1990 by the Institute for Transportation, Research, and Education, there are 1.65 miles of unpaved roads within the park. Although there is also a maze of one-lane roads crossing the park, most of these appear to be unimproved logging paths and are only 8-feet wide.

There is no development within the park, and the lake can only be reached by a four-wheel-drive vehicle. Over the years, new roads have been made by off-road vehicles to gain access to the lake and for fire protection and boundary control. The soil roads are of fine sand, and deep rutting occurs in several locations.

The entrance road is gated off to the public, but the land is so flat and thinly vegetated that people simply drive around the park gate and into the park.

#### **Recommendations**

Until a development plan of the lake is implemented, there is no recommendation to do anything to the existing road surface. There are several environmental concerns that will affect the road construction for this project.











### **MAJOR CAPITAL IMPROVEMENTS**

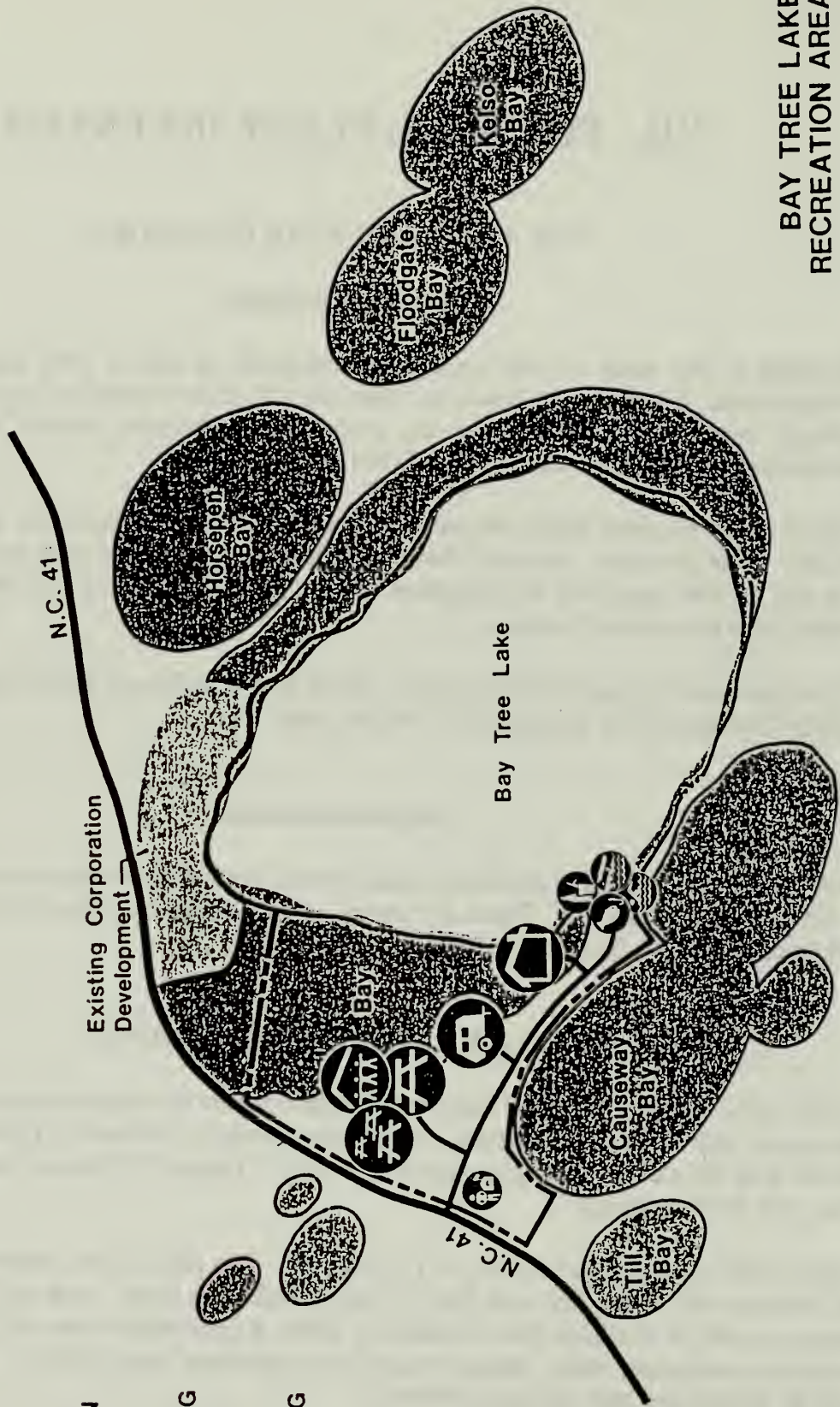
GMP review of the 1977 master plan's capital improvement recommendations resulted in general agreement with its recommendations. Some minor changes were made. Figure VII-1 shows the master plan site development plan approved in 1977. Figure VII-2 shows the site development plan after GMP revisions.

Visitors will enter the park from NC Highway 41. The park office, located on the right side of the road, will be the first park facility visitors will come upon. Park staff, information, and brochures will be available here. Behind the office, a maintenance area will be located. It will include a warehouse, shop, vehicle storage, and flammable liquid storage. A ranger residence will be constructed near the park entrance.

The focal point of the park will be the lake and lake shore facilities. A 1,000-1,200 linear-foot beach will provide ample room for extensive swimming, wading, and sunbathing. A 50-site picnic area and a picnic shelter will be located near the beach. A four-lane boat ramp will provide boating access to the lake. A courtesy dock at the boat launch, a toilet building with outside showers, and parking will also be provided near the lake shore (Figure VII-2).

# KEY

-  PARK OFFICE & MAINTENANCE
-  FOOD CONCESSION
-  FAMILY PICNICKING
-  GROUP PICNICKING
-  GROUP SHELTER
-  SWIMMING
-  UNRESTRICTED BOATING
-  FISHING
-  FAMILY TENT & TRAILER CAMP
-  FAMILY CABINS



BAY TREE LAKE  
RECREATION AREA  
SITE DEVELOPMENT PLAN

STATE LAKES MASTER PLAN  
bladen county  
north carolina

Figure VII-1. Original Bay Tree Lake Site Development



# KEY



PARK OFFICE &  
MAINTENANCE



FAMILY PICNICKING



SWIMMING



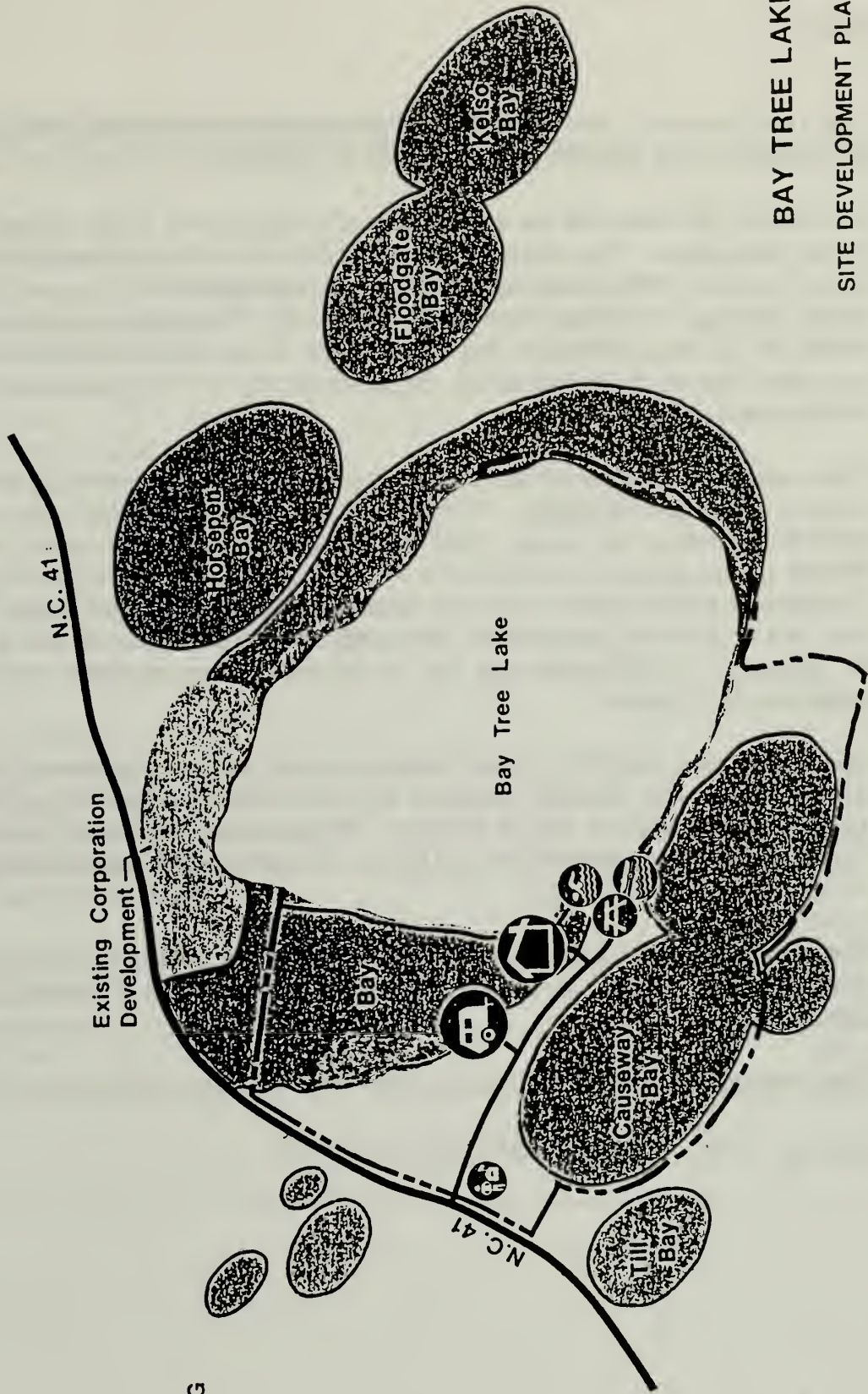
UNRESTRICTED  
BOATING



FAMILY TENT &  
TRAILER CAMP



FAMILY CABINS



BAY TREE LAKE

SITE DEVELOPMENT PLAN

bladen county

north carolina



REVISED 1995

Figure VII-2. Revised Site Development Plan

Bay Tree Lake will, when developed and staffed, operate as an independent park. It will not, as is now the case, be operated as a satellite of Singletary Lake State Park.

The master plan also calls for development of a fishing pier, family cabin area, and tent and trailer campground. Development of these facilities has been postponed. Fishing at Bay Tree Lake is poor, so little demand for a fishing pier is expected; there is no need to develop tent and trailer camping at this time when nearby Jones Lake State Park's camping is under-used; and cabins are not recommended at this time because of their high cost, the question of sufficient demand to warrant their construction, the higher priority of other types of development, and site environmental concerns.

The master plan recommends that the family picnicking, group picnicking, and group shelter be located in the park's interior. The interior site will need periodic burning, however, so picnicking needs to be moved. GMP participants agreed that picnicking facilities should be located so that picnickers would have a view of the lake, the park's primary scenic attraction. The lakeside location will also be cooler because of breezes coming off the lake. Only one picnic area will be provided. In the future, if demand and use dictate, family and group facilities can be separated. GMP participants also recommended play equipment to provide additional recreation for children.

The master plan calls for a major bathhouse facility with a refreshment concession. Initial development at Bay Tree will include a toilet and change facility, but no inside hot showers. Instead, outside showers will be provided. No permanent concession is planned at this time. Other options — such as contracting to have a concession vehicle brought in for summer months — will be considered.

The master plan calls for five ranger residences. Only one residence is being recommended with the initial development. An additional residence will be needed if overnight facilities are ever constructed.

Cost estimates for initial development at Bay Tree Lake State Park follow.



Table VII-1. New Capital Improvements - Bay Tree Lake

Initial Development

## Site Preparation:

Access road, 7,500 linear ft.	\$439,050
Beach construction	106,452
Boat launch, 4-lane	63,871
Courtesy dock	37,258
Gate	12,000
50 picnic sites at beach	53,226
80-car parking at boat launch	160,000
100-car parking at beach	<u>106,451</u>

\$978,307

## Utilities Construction:

Underground electric, 7,500 linear ft.	\$47,925
Water distribution system, 7,500 linear ft.	47,925
Well, pump, storage tank	<u>26,613</u>

\$122,463

## General Construction:

Toilet building with outside showers	\$127,742
Picnic shelter	63,871
Small park office $\pm$ 1800 sq.ft.	372,575
Standard maintenance area	399,194
Standard residence	<u>130,000</u>

\$1,093,381

Art work

21,290

Play Equipment

21,290

3% Contingency

67,102

Design Fee

184,307

Escalation — 9.6%

238,862TOTAL ESTIMATED PROJECT COST: \$2,727,002



## VIII. PARK OPERATIONS

### INTRODUCTION

The major issues concerning Bay Tree Lake were identified by Division of Parks and Recreation staff at the initiation of the general management plan process. The issues have been divided into three categories: natural resources (see Chapter VI), capital improvements (see Chapter VII), and operations. This chapter identifies park operations issues at Bay Tree Lake and makes recommendations for addressing them during the next five years.

The operations/management issues that are of significant concern at Bay Tree Lake are the problems and options concerning regulating state lakes.

### REGULATING STATE LAKES — PROBLEMS AND OPTIONS

In 1990, the assistant secretary of the Department of Environment, Health and Natural Resources requested a legal opinion regarding responsibilities and authorities of the Department regarding state lakes. Associate Attorney General Timothy D. Nifong responded to this inquiry on August 24, 1990. Assistant Secretary Dr. Lynn Muchmore asked for clarification on (1) the definition of the term "state lake"; (2) the legal status of such lakes, including their ability to be divested by the state; (3) EHNR's regulatory authority over and in state lakes; and (4) EHNR's management responsibilities for state lakes, including the ability to delegate those duties to other governmental agencies.

These questions arose from continued management concern over the effectiveness of current state lake regulations in conserving natural resources and protecting public-use rights while accommodating the legitimate rights of adjacent property owners.

State lakes are a special category of state-owned lakes. All other "non state-owned lakes" may be considered private lakes. State-owned lakes may be generally assumed to include any lake in which North Carolina holds fee simple title to more than 50 percent of the lands lying beneath the lakes' water at mean high water (Nifong-1990).

The Department's duties concerning state-owned lakes are found in Chapters 113 and 146 of the General Statutes dealing with natural resource conservation and development, and state real property, respectively. According to Nifong, the fact that these lakes are state property gives them special status, which increases state management duties for, and regulatory authorities in, them.

*In the case of those lakes explicitly designated under North Carolina laws as "state lakes," EHNR is charged with managing those properties as a public trust resource, including the prevention of unlawful, private encroachment on attendant public rights. (Nifong-1990).*

G.S. 146-13 governs the erection of piers on state lakes. This statute requires any person, firm, or corporation desiring to erect upon the floor of, or in, or upon the waters of any state lake any dock, pier, pavilion, boathouse, bathhouse, or other structure to first secure a permit to do so from the Department of Administration or the agency it designates to issue such permits. The Department of Environment, Health, and Natural Resources has been designated as the permitting agency, and the Division of Parks and Recreation administers the permit system.

According to the legal review provided by Nifong,

*EHNR has broad regulatory authority over state lakes as public trust resources. Consequently, governmental regulations reasonably related to EHNR's resource protection authority will be valid. Such regulations could validly restrict boating on state lakes, including a complete ban on the use of motorboats under appropriate circumstances.*

One of the key issues involving the administration of state lakes is the accommodation of adjacent private property interests. The present system of pier permits was initiated largely to accommodate landowner interest while protecting the right of public access, use, and enjoyment of the state lakes. In the case of some state lakes, it is arguable that the administration of this system has failed to protect the natural resource and assure continued public access, use, and enjoyment. According to the Nifong report,

*a private landowner adjacent to any state-owned lake, as a riparian owner has a right of access to navigable waters of the lake, including the right to "wharf out" (i.e., to construct piers or docks to provide such access) subject to regulatory procedures controlling the permissibility and placement of those structures. ... Even where private riparian landowners on such lakes have a property right of access to the lake by virtue of its navigability, reasonable state restriction of that private right for a public purpose will be valid.*

The effect of current state lake regulations is to establish a process through which permits shall be issued with very little provision for limiting the number, size, or placement of such structures upon the waters of state lakes. As a result, White Lake has more than 280 piers, 95 seawalls, and 286 mooring buoys permitted under present regulations. Lake Waccamaw has more than 450 piers, 89 seawalls, and 89 mooring buoys. Bay Tree Lake, with its more recent and relatively limited development, has 32 piers and 10 seawalls.

The fundamental issue regarding state lake regulations is whether or not they adequately provide for long-term protection of state lakes' scenic value, public recreation benefits, and natural resource diversity.

### **Erosion Control**

Because of the large water surface area and shallow depth of most state lakes, they are subject to moderate shoreline erosion from wind-generated wave action. These effects are mitigated by the maintenance of a natural shoreline condition in which various forms of vegetation tend to buffer the effects of the wind-driven waves. The sections of shoreline exposed to prevailing winds can and do experience varying degrees of erosion, however. Property owners in these areas have been permitted to construct a variety of seawalls, boat ramps, bulkheads and other



stabilizing structures. Permitting these shoreline-hardening structures may be contrary to natural resource processes. Further, such structures are probably not included in a riparian owner's right to "wharf out" to gain access to navigable waters.

The present state lake regulations regarding the permitting of seawalls do not comply with other regulations governing dredge-and-fill activities in state waters.

#### Recommendations:

1. The Division of Parks and Recreation should institute a moratorium on issuing seawall and boat ramp permits for a period of two years, pending the development of a comprehensive set of regulations consistent with applicable regulations of the Coastal Resources Commission and Army Corps of Engineers and consistent with protection of the state lakes as public trust resources.

The administration of seawall permits, consistent with applicable dredge-and-fill laws and regulations, is dependant upon establishment of a legally determined mean high-water mark at each state lake. Only Lake Phelps has a surveyed mean high-water reference datum (11.5 feet above mean sea level).

2. During the moratorium on construction of new seawalls, the Division of Parks and Recreation should conduct appropriate studies and surveys to establish and mark in the field the mean high water mark for Bay Tree Lake, Lake Waccamaw and White Lake.

### **Resource Protection**

Currently, all state lake regulations apply equally to subject lakes. Without established criteria for restricting or denying permits, it may be only a matter of time before the shoreline of Lake Waccamaw and Bay Tree Lake are developed to the extent that White Lake is. There is little argument that the natural resource and scenic values of White Lake have been largely dissipated through extensive development of private and commercial piers, seawalls, and boat ramps. There is also evidence that the carrying capacity of the lake in terms of boating-related recreation has been exceeded, resulting in deterioration of the recreational experience and damage to the lake's hydrology.

#### Recommendation

1. In order to better plan for the future protection of the natural resources at Bay Tree Lake and Lake Waccamaw, the Department should develop regulations and procedures to implement shoreline-management plans. A shoreline-management plan would evaluate the significance of natural resources and processes, analyze the potential impact of adjacent private development, and designate appropriate sections of shoreline for varying degrees of development or protection. A method of controlling the density of piers and docks upon state lakes should be developed.

## Structural Specifications

Current state lake regulations contain general limits on the length, placement, and configuration of permitted structures on state lakes. Additionally, there are size limits on various subcomponents of these structures such as platforms, pavilions, and patios. The general nature of these structural specifications has allowed an intriguing variety of imaginative configurations. Whereas the more elaborate and imaginative configurations may meet the letter of the current regulations, the cumulative effect of such massive structures is, at best, mere degradation of the lakes' scenic shoreline. At worst, such elaborate structures far exceed an adjacent property owner's riparian rights and give the appearance of granting exclusive private use of public-trust waters.

The rewrite of state lake regulations in 1974 attempted to further restrict allowable pier configurations and to provide a mechanism for gradually eliminating non-conforming structures. The most notable effect of the 1974 regulations was the stricter limitation placed upon the storage of boats associated with piers. The regulations, however, also provided for virtually unlimited installation of mooring buoys spaced a minimum of 25 feet apart. If the intent of the 1974 rewrite of the regulations was to limit the number of boats stored on state lakes, it has largely failed with the dramatic proliferation of mooring buoys.

With regard to mooring buoys, another safety concern is the ultimate disposition of abandoned buoys and their associated anchors. Abandoned screw anchors on the floor of state lakes are a serious threat to public health and safety, and the Division of Parks and Recreation devotes substantial effort to discovering and removing these devices. Since the current state lake regulations do not adequately specify structural details for approved mooring buoys, a wide variety of devices are used.

### Recommendations

1. State lake regulations should be rewritten to include more definitive structural specifications for piers, buoys, and other permitted structures, including maximum and minimum dimensions and setbacks. The objectives of such structural specifications should be to provide minimum accommodation of riparian access rights, provide maximum protection of natural resource processes, and provide reasonable protection of state lakes' scenic and recreational values.
2. Regulations should be promulgated to accomplish the elimination of non-conforming piers within a reasonable time frame, such as within 15 to 20 years.

## Permit and Lease Fees

The present set of state lake regulations provides for riparian property owners and others to apply for and secure permits to build and maintain various structures on state lakes. Permit application fees for construction, modification or reinstatement of an expired permit are \$60. Application fees to transfer permits to new owners is \$30. Application fees for nonconforming-use permits are \$150. In addition to these initial fees, permittees are assessed annual fees based upon the

type and size of permitted structure. These fees range from \$15 annually for mooring buoys, boat ramps, and piers less than 50 feet in length to \$60 per year for private piers greater than 150 feet in length, and \$150 per year for commercial piers greater than 225 feet in length. These permit fees were increased in September 1991 after 15 years without an increase.

In recent years, the General Assembly has directed studies of regulations and fees associated with leasing submerged state lands for private or commercial purposes. Several states were surveyed for comparable lease rates and administrative procedures. Preliminary recommendations to the General Assembly included the establishment of a lease fee schedule of approximately \$.10 per square foot per year. The report's recommendations were criticized by environmentalists for being too lenient, considering the fair market value of large-scale coastal marinas and the attendant escalation of real property values associated with private marinas. Computed on a square footage basis for a typical private pier with one platform, permittees pay \$0.02459 (less than 3¢) per square foot per year for the privilege of maintaining the pier on a state lake. A commercial pier constructed to its maximum length and width with one platform costs the permittee \$0.01974 (less than 2¢) per square foot per year. The placement of mooring buoys at a minimum distance of 25 feet from any adjacent structure or buoy in effect allocates a circular anchorage with a radius of 25 feet (an area of 1,964 square feet). Buoy permittees are charged \$0.00764 (less than 1¢) per square foot per year.

Preliminary recommendations of the Submerged Lands Review Committee suggested an annual leasing fee of \$.10 per square foot. Although the sufficiency of this fee to compensate adequately for the loss of public-use rights is debatable, it appears that the current state lake pier permit fee schedule is very conservative.

### Recommendation

1. Any revision of the state lakes permit regulations should include an objective assessment of the current fee schedule. This assessment should be consistent with the evaluation of public-use rights foregone by permitting the installation of permanent structures on submerged state lands. The establishment of a fee schedule for submerged lands other than state lakes should be fully considered in the revision of state lake permit fee schedules.







## IX. LAND ACQUISITION NEEDS

### LAND ACQUISITION STATUS

Bay Tree Lake State Park presently contains 609 acres of land and 1,418 acres of water for a total of 2,027 acres. All the land at the state park was acquired in two transactions in 1979 and 1981.

### FUTURE LAND ACQUISITION NEEDS

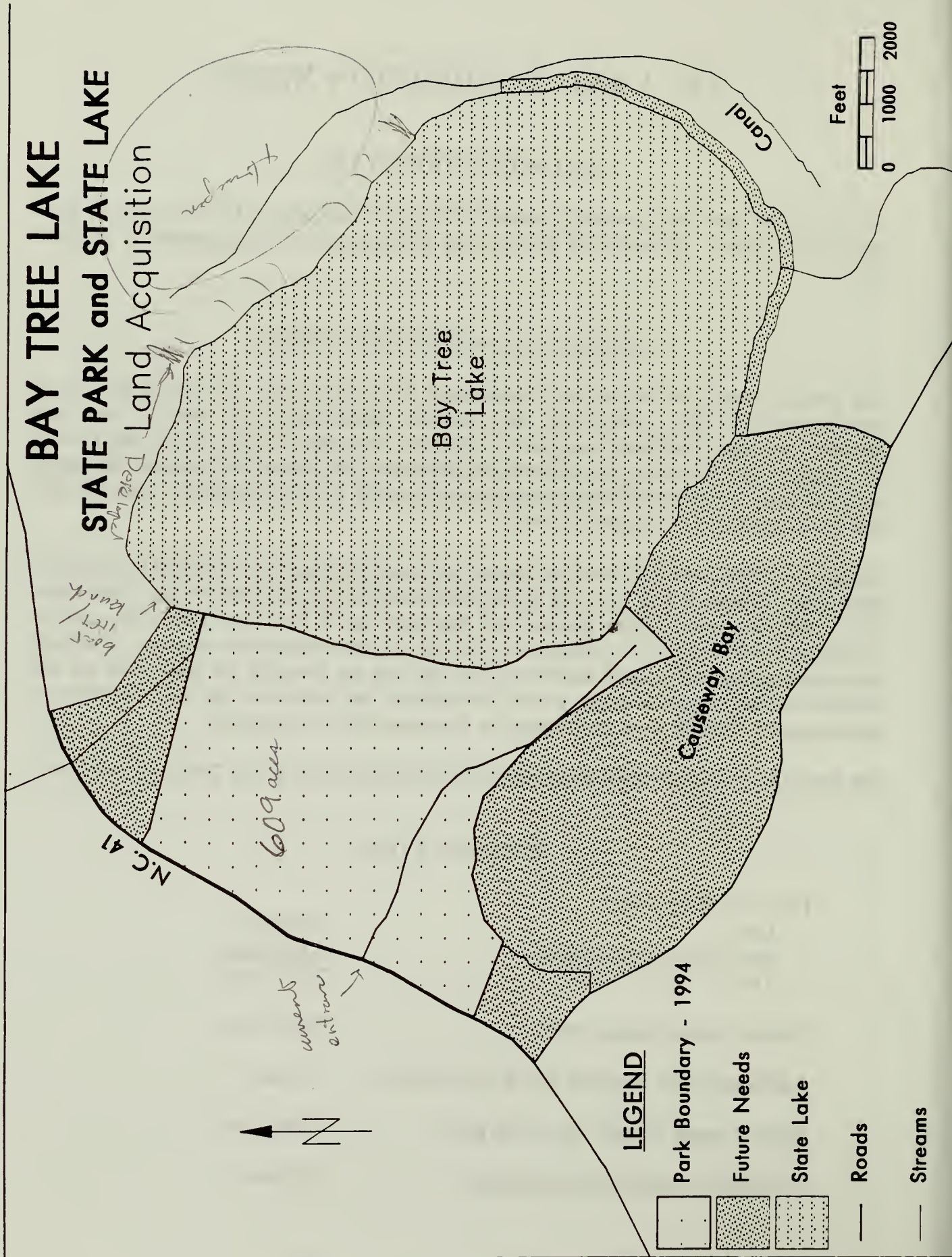
The original master plan for the park encompassed 609 acres of land. The last of these lands were acquired in 1981. During the GMP process, approximately 753 acres of land were identified that need to be added to the park's master plan boundary. In order to adequately buffer the proposed facilities along the southwestern shoreline of the lake all of Causeway Bay needs to be acquired. To avoid a difficult management boundary, the land in between Causeway Bay and N.C. Highway 41 is needed as well.

In addition, the undeveloped shoreline around Bay Tree Lake needs to be acquired to protect the lake's scenic values and to avoid the management problems found at White Lake State Lake. All of the land north of the present park boundary up to Bay Tree Lake Corporation's development and from N.C. Highway 41 to the lake's shoreline needs to be acquired. The lands along the southern and eastern shoreline of the lake that are presently not subdivided are also needed in order to prevent future private development and docks onto the lake. A buffer of approximately 200 feet from the shoreline is recommended to be acquired.

See Figure IX-1 for the revised master plan land acquisition needs at Bay Tree Lake State Park.

### SUMMARY TABLE

1994 size of the park	
Land	609 acres
State Lake (water surface)	<u>1,418 acres</u>
Total	2,027 acres
Original master planned needs	2,027 acres
Additional needs identified during GMP review	753 acres
Revised master planned size of the park	2,780 acres
Additional recommended acquisitions	753 acres





2/23/05

Initial Dev. R. off picnic land 736 \$5.2  
Phone # Copy, min, between \$2 mill 360  
Barnes + Nye - probably OK  
Opposed - Ladoum  
± 70 piers

1.65 mi. road ± 50' wide needed  
ramp

No WRC ramp. Their accen private. Why?

Nature C. bgs, Little Singletary, now WRC.

Still 609 acres, 9 yrs later.

Need more land.